DOCUMENT RESUME

ED 044 921 EM 008 578

AUTHOR	Bloomberg, Marguerite
TITLE	An Experiment in Museum Instruction.
INSTITUTION	Cleveland Museum of Art, Ohio.
SPONS AGENCY	American Association of Museums, Washington, D.C.
PUB DATE	2º
NOTE	36p.; American Association of Museums, New Series Number 8
EDRS PRICE	EDRS Price MF-$0.25 HC-$1.90
DESCRIPTORS	*Art, Art Activities, Art Education, *Educational Experiments, Grade 5, Independent Study, *Instructional Trips, Lecture, *Lesson Plans, *Museums, Slides
IDENTIFIERS	*Cleveland Museum of Art

ABSTRACT

Various lesson plans for museum instruction were tested on fifth grade children of fair and high intelligence in an attempt to improve upon the "accepted method" of teaching, which was thought to be better suited to the child of low intelligence than to his abler classmates. The lesson plans tested were: (1) the accepted method (teacher-presentation of all material), (2) interest as a guide (each child followed his own inclination), (3) question and investigation (the interest of the child was stimulated by pertinent questions), (4) fairy story method, (5) a comparison of the life and art of two ancient civilizations, (6) an introduction to the gallery experience by slides and a lecture, (7) schoolroom preparation before the museum visit (either a day ahead or a week ahead), (8) drawing method (the child answered questions by drawing), and (9) the instructive story method. The material chosen for the study was Egyptian. For children of high intelligence, plans 7 (one-week preparation), 3, 8, and 7 (one-day preparation) were of most value, in that order. For children of fair intelligence, plans 3, 8, and 7 (one-day preparation), in that order, were markedly superior. One of the general observations was that too much material was presented at a single lesson in all of the plans. New plans and further experiments are suggested. (MF)

U.S. DEPARTMENT OF HEALTH, EDUCATION
& WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

ED044921

AN EXPERIMENT IN MUSEUM INSTRUCTION

By MARGUERITE BLOOMBERG
Department of Educational Work
The Cleveland Museum of Art

Conducted at The Cleveland Museum of Art to Determine the Relative Effectiveness of Several Types of Museum Lessons for Children of Average and High Mentality

EM008 578

PUBLICATIONS OF
THE AMERICAN ASSOCIATION OF MUSEUMS
New Series, Number 8
WASHINGTON, D. C.
1929

AN EXPERIMENT IN MUSEUM INSTRUCTION

By MARGUERITE BLOOMBERG
Department of Educational Work
The Cleveland Museum of Art

Conducted at The Cleveland Museum of Art to Determine the Relative Effectiveness of Several Types of Museum Lessons for Children of Average and High Mentality

PUBLICATIONS OF
THE AMERICAN ASSOCIATION OF MUSEUMS
New Series, Number 8
WASHINGTON, D. C.
1929

FOREWORD

I wish to express sincere appreciation to Dr. Garry C. Myers of the Cleveland School of Education for planning and directing the experiment; to Miss Elizabeth Judkins, Mrs. John Parker, and Miss Margaret Guthrie for their volunteer assistance in scoring and recording; to Miss Anna Ravitsky of the Bureau of Educational Research for statistical work in making the comparisons; and to Mr. William L. Connor of the Cleveland Board of Education, for his generous coöperation and valuable advice in interpreting the statistics and in drawing conclusions.

M. B.

Charts I, II, and III deleted due to poor reproducibility, by ERIC at Stanford.

INTRODUCTION

Visits of school classes to art museums have shown evidences of success in many museums under most diverse treatment. Children have had a good time, teachers have praised the lessons, other school teachers have reported brilliant results in after affect. Almost any procedure seems to generate a degree of success, provided it is voluntarily undertaken and intelligently followed. Some years ago we—that is, the Department of Educational Work in The Cleveland Museum of Art—decided to try checking these results in order to guide our work.

This checking had to be done with the least possible interference with the great body of school work at the Museum, with all its freedom and spontaneous enjoyment. So of the six teachers only one—for the first years Miss Katharine Gibson, for the later years Miss Marguerite Bloomberg—carried on the experiment, and that only in one subject. Furthermore, great pains were taken that the experimental classes lose nothing of pleasure, a very important element in all art study.

The results Miss Bloomberg will report. The conclusions are her own, but for the most part I agree with them.

The general truth of them is evidenced by their agreement with modern theories of education. We have judged it unnecessary to separate inspiration from learning, because things enjoyed are likely to be remembered—if clearly understood at the time of the inspiration, then clearly remembered—so that a test of learning is in some sort a test of enjoyment of observation. Independent thinking is the only real thinking. Active attention can be insured only through active expression. Motivated observation is more effective than directed observation. Ripened interest is more likely to persist than the inspiration of an hour. Children of high intelligence behave differently from those of low intelligence.

Every modern teacher knows all this. Yet the constant temptation of the museum teacher is to share too much knowledge with the children, to be satisfied with eager response without knowing whether or not the children have digested the knowledge and made it their

own. Hence the importance of reporting to all the enthusiastic museum teachers the results of this long and careful examination of the effects of museum visits.

The teachers in The Cleveland Museum of Art have always shown a diversity of procedure, and they always will. Differences of temperament and training make this inevitable—and it is not undesirable. The only attempt toward unification has been in weekly discussions around a tea table (the tea is important) during which we have each year studied some aspect of art education, always avoiding such definiteness of conclusion as would limit the freedom of any teacher. The data given in this report of Miss Bloomberg's have been the subject of much discussion. They have tended to make more general the practices which have been indicated as the more successful, and they have added new practices. Probably we would not unanimously adopt all of the conclusions of the report, but on the whole a new and common viewpoint has permeated the staff.

Since Miss Bloomberg wrote her report, a system of coöperation largely planned by her, has been adopted between the Museum and two of the suburban school systems which substantially puts into effect the evolving theory and practice. The art supervisors of the schools of these two small suburban systems knowing each class and its plans, schedule class visits at the point in their studies when a museum visit will contribute most. About ten days before each visit the class teacher receives a letter from the Museum asking the general grade of intelligence of the class, what the class is doing in the subject chosen, how far along it is, what phase of the subject it wishes to investigate at the Museum; and furthermore it asks that the teacher get the class itself to formulate a number of questions to which the children wish to find answers in the Museum collections. That letter insures the coöperation of the class teacher, the eager interest of the class, and a special preparation on the part of the museum teacher of a unique lesson, alive, elastic, adapted to the needs of one particular class at one moment. The class teacher frequently carries away photographs or lantern slides to be used later. The apparent results are gratifying. Doubtless experience, common sense, and future checking will demand gradual changes in the plan. But even now the Museum staff feels that these labors of Miss Gibson and Miss Bloomberg have brought about very satisfying changes.

ROSSITER HOWARD.

CONDITIONS LEADING TO THE EXPERIMENT

How museum material can be used to the greatest advantage is a subject which has, as yet, been little investigated. Miss Katharine Gibson, Museum Instructor at The Cleveland Museum of Art, realizing that we know little of the effect of our instruction upon the children who come to us at The Cleveland Museum, undertook in 1923–24 an experiment[1] by which she hoped to determine for what type of child the lesson plan most in vogue was best fitted.

The children with whom the experiment was conducted were selected from among those who come to The Cleveland Museum from the public schools, under the plan of cooperation between the public schools and the Museum. In general these children come for a variety of reasons—instruction in art, art appreciation, correlation of art with history and geography, and the like. The children chosen to take part in the experiment were from the fifth grade, coming with a major interest in one of two subjects. Some wished picture study, as such; the majority were studying colonial history and wished to see such objects as would make that period live.

The method of instruction used was the one which has been most in vogue with museum instructors for many years. This we have called the "accepted method." In this method the teacher leads the discussion, at times lecturing, often interspersing her remarks with questions. It has been used in preference to other methods, in all probability, in order that as much significant material as possible can be covered in the limited time usually given to any one group of pupils.

The plan was to conduct the experiment with the Z group of students,[2] as it was felt rather generally by the museum instructors that

[1] A report of this experiment was published by Miss Gibson in "School and Society," May 30, 1925: "An Experiment in Measuring Results of Fifth Grade Class Visits to an Art Museum."

[2] A word perhaps would not be amiss here on the meaning of terms. The children of the public schools of Cleveland have been classified by the National Intelligence or the Binet Test into groups according to their mental ability. Those who, according to these tests, rank highest in mentality are called the High Intelligence Quotient Group (Probable Learning Rate or Intelligence Quotient: 125 or above); those who rank high, the X Group

the Z classes presented an unsolved problem in museum instruction. However, in some of the smaller schools, the various mental levels are not segregated into special rooms, but are grouped together. Since groups come to us at the Museum as they are normally grouped at school, the experiment of necessity included, therefore, X and Y responses as well as the Z.

There had been a rather general feeling among members of the museum teaching staff that the results of the "accepted method" would be better for the children of high mentality (the X's, than for those of medium and low intelligence (the Y's and Z's). Miss Gibson compared her results with those of W. W. Theisen on "the relative progress of groups sectioned on the basis of ability," and his results: "as a rule the sections that made higher intelligence test scores in each school excelled in scholarship." From these results it would be expected that in the museum experiment the X child would score considerably higher than the Z child. It was a matter of surprise to find, then, that the results of Miss Gibson's experiment were exactly the opposite of what might be expected. That is, the Z's averaged curiously high throughout. In comparison to their mental ability the X's scored low. These results would lead one to think that the method used—the "accepted method"—was better suited to the child of low mentality than to his abler classmates.

We would seek, therefore, some explanation of the failure of this method to win from the X or Y child his best response. There are, in the first place, certain marked differences between the mentality of the X and Z child. Dr. Thorndike[3] has pointed out that the child of high mentality works with greater intensity and performs more difficult tasks than does the one of low mentality; he spreads further over the field; he travels at a greater speed, not only in the learning process but in this intensive and extensive searching after facts and ideas. Further, the X child seems to differ in other ways from the Z child. He is not so content to accept the opinion of another person about the thing which he observes as is the child of lower mentality. He looks about, weighs, considers, judges for himself, and then accepts only if he is convinced. Probably the "accepted method" did not create such a situation as would enable the X child to work to the

(P. L. R. or I. Q.: 110–124); those who rank average, the Y group (90 – 109); those who rank lowest, the Z group (below 90).

[3] E. L. Thorndike, "The Measurement of Intelligence," pp. 22–36.

greatest advantage. A method which would be successful for the bright child must permit him to function normally.

PLAN OF THE EXPERIMENT

We were thus confronted with the problem of finding new types of lessons which should prove better suited than the so-called "accepted method" to the children of fair and high mentality, the Y's and X's. Accordingly, in 1924–25, the year following Miss Gibson's experiment, preliminary to the new experiment, various lesson plans were tested by a common-sense method for their value in reaching these goals. In each plan the materials presented were the same. These materials were selected as the result of two sets of interests: those of the child and those of the group of museum instructors. In an endeavour to avoid the error of imposing upon the child at the time of his museum visit some interests not his own, we asked several hundred children to designate the objects which were to them of particular interest and enjoyment. The staff also designated what things of superior quality they felt should be remembered after a visit to the Egyptian gallery. as a matter of fact, these interests often coincided. When they did not, an effort was made to develop from the child's first and often superficial interest both a deeper and a more aesthetic appreciation. However, no material was used which, so far as experimentation could determine, failed to win either the spontaneous or the cultivated interest of the child.

TESTING

In the plan of the experiment all children, irrespective of lesson plan used, were to be tested by the same set of questions. These were not intended to be a test of memory, but were to determine, if possible, a child's response in three directions: first, the accuracy with which he had observed; second, the concepts and conclusions which he had formed from his observations; and third, the aesthetic responses he had made to various selected objects. We have not yet been able to measure the child's aesthetic enjoyment as such.

Finally, the plan of procedure provided that after an interval of from two and a half to three months the same children who had been tested at the Museum should be tested at their schools by the same test questions. We hope that after an interval of three years the same children can be located and tested for the third time on these

questions. Of the three measures of learning,—how accurately learned, how rapidly learned, how long retained,—the most important is probably the last.[4] The results of the delayed test seem to be of more value than those of the immediate one, and the results of the second delayed test yet to be given may prove to be of more value than either.

The test questions follow:

.....Name
.....School....Grade
.....Teacher
.....Date

CLEVELAND MUSEUM OF ART

QUESTIONS ON EGYPTIAN LESSON

I. UNDERLINE ALL THE CORRECT WORDS:
We know that the Egyptians were a civilized people because tney
(a) had sewing machines
(b) made good pottery
(c) used automobiles
(d) developed an alphabet
(e) wove fine cloth
(f) traveled in street cars
(g) built good furniture
(h) made beautiful jewelry
(i) traveled in aeroplanes

II. FILL IN THE CORRECT ANSWERS:
1. We are able to learn about the Egyptians because they left records.
Name three different kinds of records that you have seen in this room:
1. ..... 2. ..... 3. .....

2. We have these records today because they were safely preserved in the
.....

3. UNDERLINE THE STATEMENT WHICH IS CORRECT:
The objects in this room show that
(a) the Egyptians lived a happy life as we do
(b) the Egyptians were a mournful people thinking mostly of death

III. UNDERLINE THE CORRECT WORDS:
1. The Egyptian artist generally made the figures which he sculptured
(a) dignified
(b) free and easy
(c) quiet
(d) lively
(e) solemn
(f) full of grandeur

2. The artist who carved these figures was most interested in making
(a) a beautiful body
(b) a faithful likeness of the person.

---

[4] Cf. E. L. Thorndike, "Educational Psychology," Vol. I, p. 194.

IV. ANSWER THE FOLLOWING:

1. Did the Egyptian artist generally paint the human figure as
   (a) standing in a natural position.....
   (b) turned so that one can see as much of the figure as possible.....

2. Mention (by name on label) an object in this room which shows that the Egyptian artist could fill a space well.....

3. What three colors did the Egyptian artist use most in this room?
   ....., ..., ...

Upon first glance, these questions appear to have been devised to test whether the child can report back an accurate response to certain facts which have been presented to him. In reality, only Question II, part 2, calls for such response. That is because there is no visual material in the room upon which the question was based. All others win from the child a response which comes as the result of something which he has himself experienced, either intellectually or aesthetically. Let us examine the questions in detail.

The subject matter of the questions becomes more intelligible when we recall that the Egyptian lesson is given at the request of two sets of interests, those of the history teacher and those of the teacher of the fine arts. A portion of each lesson may be of assistance to each. The test thus includes this combination of interest. Questions I and II test the children's responses to the objects which illustrate the physical life of Egypt, the living conditions of the people, their beliefs and standards of civilization. Questions III and IV test the response to the production of the Egyptian in the field of the arts—painting and sculpture.

We can now note in what manner the response is won so that it comes as a result of the experience of the child instead of as a recital of facts memorized when repeated after another. Let us examine, for instance, Part 3 under Question II:

3. UNDERLINE THE STATEMENT WHICH IS CORRECT:
   The objects in this room show that
   (a) the Egyptians lived a happy life as we do
   (b) the Egyptians were a mournful people thinking mostly of death.

The answer credited correct is "(a)". The children were not told this answer. Through the leadership of the teacher or by their own interest (depending upon the lesson plan used) they found all the objects of daily life which would indicate the state of civilization. When they had observed the jewels, the pleasure boat, the fine dishes, and vari-

ous other objects, they concluded that life, after all, was a happy thing. Again, Part (d) under Question I, called for an affirmative response. The children worked with the instructor in tracing the development of the alphabet from the picture-writing stage. We might thus continue through each portion of the test.

So, too, with the presentation of those objects which call forth a response which may be called aesthetic. The study of aesthetics has taught us that a physical reaction, entered into whole-heartedly, determines a consequent emotional response. Whenever possible, the response of the child to the art material is secured by a physical reaction, either through drawing or a bodily reaction. Thus the child is enticed to draw the object of beauty. By means of a motor response he gains a heightened reaction. Or he will act out the position of the figure of sculpture or painting, assuming the pose with its implied muscular tensions, as nearly as possible.[5] No matter which method was being used, the child was urged to make this bodily, or as the Germans say, empathic response. Thus the use of visual material has created a means whereby education becomes a matter of experience instead of a memorization of facts.

CONDITIONS OF THE EXPERIMENT

The material, then, for presentation and testing was the Egyptian, as its quality and quantity seemed representative of the Museum, and as the demand for it by 6B teachers during a large portion of the school year made it feasible for experimentation with large numbers. The children of 6B grade, studying Egypt in their history hour and often working out art projects in correlation. The length of time for each lesson was one hour and twenty minutes. The same instructor presented all plans and did all testing. The lesson plans were rotated exactly in order (as numerically noted below), regardless of what particular phase of Egyptian life the children were studying in school at the time. It was imperative, of course, that the wording and presentation of a plan be exactly the same each time the plan was given. When it was necessary for the instructor to explain a point in any plan, she invariably made this explanation in precisely the same way.

[5] Cf. Th. Lipps, "Aesthetische Einfühlung," in Zeitschrift für Psych. u. Phys. der Sinnersorgane, Vol. 22, 1900, p. 439 ff.
....., "Raumaesthetik," p. 5.

One element which could not be controlled was the choice of teacher who accompanied the children at the time of their museum visit. Sometimes it was the classroom teacher, and on other occasions it was the home-room or a chance substitute teacher who had given no instruction to the pupils in the subject for which they came to the Museum. This variation in class-teacher occurred also when the museum instructor went to the school to give the preliminary lesson. It must have exerted some influence upon the plan, but no account could be kept of this variation, nor could it be gauged any more than we could gauge how much or how little discussion was carried on after the visit of the museum instructor to the school, or by the various teachers upon their return to school after the museum visit.

In the summary of the plans which follow, two terms need explanation. The "introduction" spoken of was given whenever the length of the plan permitted. This included a short word picture of Egypt, drawn from the children when possible (not all children were equally advanced in their study at the time of their museum visit). This picture consisted of sketching the appearance of the country, considering what monuments one could find there, stressing the importance of the Nile, and trying to understand the nature of the worship which was offered the Nile and the Sun. We thought that such an introduction would create an atmosphere for the material itself. When time permitted, this introduction was given before entering the Egyptian Gallery, in the adjoining Colonial Room. The reason for this is apparent: children, upon entering a gallery which is the object of their visit, want to look about immediately. Any sort of introduction once they are in the gallery, unless it be an appealing story, seems to be more of an annoyance than an aid.

The "difficult words" below noted, were also given when time permitted. Most museum labels are written not for children but for adults, and the children are constantly interrupted in their appreciation by unfamiliarity with a word. After several hundred children had designated in writing the words on our Egyptian labels with which they were unfamiliar, the five words causing most trouble were chosen for presentation: papyrus; tomb; ushebti; dynasty; and the correct reading of a date, for instance, 332–30 B.C. This was the largest number of words possible for presentation in the five-minute period. Here again the discussion, when possible, took place outside the Egyptian gallery. We hoped that thus with vocabulary hin-

drances disposed of and an atmosphere created, the child might be placed in a proper mood for a lesson in appreciation.[6]

LESSON PLANS

The preceding pages have stated various beliefs in regard to the purpose and practice of art instruction within the Museum. Underlying these beliefs are two fundamental principles toward which all of our teaching aims: first, to have the children enjoy the works of art directly; and second, to have them integrate their acquaintance of art with their knowledge of history, for instance, and life in general. The lesson plans which follow were developed in the hope that from them some might be found which would most nearly make these objectives a reality.

From the plans tested by the common-sense method in 1924–25, the following were chosen for the experiment proper in 1925–26:

PLAN I: ACCEPTED METHOD. The teacher presented all material, the pupils discussing and asking questions.

Problem: The doubt that has arisen in school pedagogy in regard to the value of a method by which the teacher leads, and the child is bidden to follow at her direction, has made this method seem of importance for experimentation within the museum. Miss Gibson therefore experimented with this plan, and found it better suited to the child of low mentality than to the X child.[7] This method as such, therefore, is not tested out in this experiment. It is, however, used in conjunction with some other condition where it has, by usage, become a part of a certain plan (Plans IV, V, VI and IX).[8]

Method: The instructor presented the various points of interest, leading the discussion and asking questions. The children were given an opportunity to observe the objects for themselves, either during or after the discussion, and to ask questions.

PLAN II: INTEREST AS GUIDE. Each child followed his own inclination, searching out where his interest led.

Problem: Since, in the first experiment, the bright child showed himself little adapted to the conditions of Plan I, we sought a method whereby he might follow his own impulses and interests as they manifested themselves spontaneously. Instead of prescribing what he should observe, we permitted him to follow his own inclination. Where his own observation and resources failed, the adult stepped in, directed and advised.

Method: "Introduction" and "difficult words" in the adjoining room. The children were told to go into the Egyptian Gallery and see what they could observe. After five minutes each child was asked to select the one object of most interest to him. Then he

[6] Cf. Hayward, "The Lesson in Appreciation," pp. 14–16.
[7] Cf. above, pages 7–9.
[8] Cf. below, pages 15, 16, 18.

was given two and a half minutes to prepare an oral composition for presentation to the class. Children were then called upon individually to give their talks. Where they failed to penetrate as far as might be desired, the instructor stepped in and assisted, more by the question method than by the lecture. The test questions followed this discussion.

PLAN III: QUESTION AND INVESTIGATION. The interest of the child was stimulated by pertinent questions which enticed him to investigation.

Problem: Plan II provided entire freedom for the child. Plan III was developed in our searching for a method whereby the child could use his own faculties to the utmost and yet, as he did not in Plan II, work under some direction. We wondered whether a set of questions on a paper would interfere with the child's working independently, or whether he might not work better with them as a guide. These questions were not meant to limit the child to an observation of the objects mentioned in them; rather they were meant to act as a kind of impetus to other objects and interests.

Method: "Introduction" and "difficult words" were given in the adjoining room. Children then given list of questions and told to go into the Egyptian Gallery and answer them either mentally or by writing the answer beside the questions. These questions had been determined the previous year after much experimentation to ascertain what would actually interest the children.

The questions follow:

1. Can you find any objects in the room which show that the Egyptian was a fine workman? What are they?
2. Did the Egyptian know how to weave? To write? What makes you think so?
3. What colors did the Egyptian artist use in his painting? Can you stand in the same position as the figures which the Egyptian artist painted?
4. Go up to a piece of sculpture in the round.
   Try to place yourself in the position of the figure which is carved there. How do you feel?

Ten minutes were given for answering the questions. Each point in the list was then discussed by the class as a whole. The final test questions followed this discussion.

PLAN IV: FAIRY STORY METHOD. The imagination of the child was stimulated by the creating of an atmosphere of romance wherein the museum objects could find a place.

Problem: A method used by many museum instructors is to make use of a story to introduce the museum lesson, in the hope that by such means an atmosphere will be created in which the correlative material will appear more vivid. It has, however, been a matter of doubt whether a story thus told does not lessen the effectiveness of the material itself. If, after a museum lesson of this type the story alone is remembered, or if it is remembered above all else, or if the material is thereby made commonplace in comparison, then the story will have assumed undue proportions.

Method: No "introduction," as the story provided "atmosphere" and a survey of the country. "Difficult words" given in the Egyptian Gallery. The fairy story of Nitocris, the Egyptian Cinderella, then told (twelve minutes). Children were asked to find those objects in the room which were mentioned in the story or might have some connec-

tion with it. Class discussion on these objects then followed, centering on the story. (A modification of Plan I.) The test questions were then given.

PLAN V: COMPARISON WITH GREECE. The life and art of Egypt were compared with the life and art of Greece.

Problem: Most 6B classes come to the Museum only once during the term in which they study at school the civilizations of Egypt, Greece and Rome. Naturally they are eager for a survey-picture of the art of all three countries. From this need there has grown up a lesson plan in which the arts of Egypt and Greece are compared. We wondered also whether an art as foreign as the Egyptian might not better be understood if compared with another, especially since the child has practically no background of art observation and experience. There is the danger, we have realized, that the child may grow confused as to the qualities which belong to these two different arts.

Method: Introduction in Egyptian Gallery. Material in Egyptian Gallery presented, following which the class proceeded to the Greek Loggia where a comparison was made (fifteen minutes) between the Greek and Egyptian arts. (Modification of Plan I.) The class returned to the Egyptian Gallery where the test questions were given.

PLAN VI: LANTERN INTRODUCTION. A background was provided by slides shown at the Museum immediately before going into the gallery.

Problem: The method of introducing the museum lesson by giving a lecture with slides has been used rather regularly in the classroom of the Museum by the teachers employed by the Board of Education. Its aim has been to provide a background of the life and country of the people studied, since the children do not come equally well-prepared. There has been some doubt expressed whether the slide work does not out-weigh the museum material, which should be the chief object of the children's visit.

Method: Introduction by slides given for thirty minutes in the classroom, creating a background for the lesson. No "difficult words" given because of lack of time. Class then proceeded to gallery for presentation of museum objects. (Modification of Plan I.) The children were then given an opportunity to observe the material for themselves. The test questions followed.

PLAN VII: ONE-DAY—SCHOOLROOM PREPARATION. The background by slides was provided in the schoolroom one day before the museum visit, the museum teacher instructing. When the child reached the museum he followed his own individual interest.

Problem: Since many children come to the Museum for a subject not yet treated at school or not completely treated, it was thought that a slide lesson in the schoolroom would furnish such background as would not only motivate the museum lesson but make it of greater significance. This would therefore leave the entire time at the Museum free for the objects themselves. At precisely what interval before the museum visit this talk would prove to be of greatest benefit was not known. It was planned, therefore, to test out two intervals: one in which the school lesson occurred the day preceding the museum visit (called Plan VII: One Day—Schoolroom Preparation), and one in which the school lesson

occurred a week preceding the visit to the Museum (called Plan VII: One Week—Schoolroom Preparation.

Method: The museum instructor went to the school one day preceding the coming of the class to the Museum and used the same slides to give the background as in Plan VI, but the effort was constantly made to connect slides with material to be shown at the Museum the next day. On arrival of class at Museum, no "introduction" was necessary. "Difficult words" were given in the adjoining room. Procedure of Plan II then followed, the child observing and then selecting the object of special interest. There was this variation from Plan II,—the children prepared their little talks in writing (four minutes), thus increasing their concentration upon a special object. Following the presentation of these choices and the discussion upon them, were the test questions.

PLAN VII: ONE WEEK—SCHOOLROOM PREPARATION. This plan differs from Plan VII: One Day—Schoolroom Preparation only in that the museum instructor went to the schoolroom to present the background one week preceding the coming of the class to the Museum. The procedure upon arrival at the Museum was the same in both cases.

PLAN VIII: DRAWING METHOD. Interest of the child was stimulated by pertinent questions which he was asked to answer by drawing.

Problem: Plan III presented questions which called for answer in writing. In Plan VIII this answer was asked for in drawing. Drawing has a value similar to that of writing in clarifying ideas and making them memorable. A child may draw for this informative purpose only. He may, in addition, gain a value from drawing such as he could not gain from writing; that is, by this physical reaction he may gain a heightened emotional response. We hoped to determine if drawing, either noetic or emphatic,[9] (it is hard to know where one ends and the other begins) would gain from the child a better response than was secured by writing.

Method: No "introduction" or "difficult words" because of lack of time. The class, upon entering the Egyptian Gallery, given list of questions to be answered. There were practically the same as in Plan III, except that a drawing, instead of a written, answer was asked for.

The questions follow:

1. What objects in the room show that the Egyptian was a fine workman? Draw one made of clay. Mark this drawing NUMBER I.
2. Copy one example of Egyptian writing. Mark this drawing NUMBER II.
3. Copy a standing human figure from a painting or from a picture in stone. Mark this drawing NUMBER III.
4. Draw a human figure from sculpture in the round. Mark this drawing NUMBER IV.

The drawing was followed by class discussion as in Plan III, the class working out the answers together. The final test questions were then given.

---

[9] Cf. above p. 8.

PLAN IX: INSTRUCTIVE STORY METHOD. The story of a scribe whose possessions are in the Egyptian Gallery was told in order to furnish a realistic background.

Problem: As in Plan IV, the object was to test out whether a story would create a situation which would cause the material to seem more vivid and real. This plan is to be contrasted with Plan IV in that the story used was built on reality: the central figure was Senbi whose sarcophagus and some former possessions are in the gallery. The story, therefore, did not remove the child to an artificial situation.

Method: No "introduction." "Difficult words" were given in the Egyptian Gallery. Story of life of Senbi and his parents was then told. Children then given opportunity of finding objects mentioned in the story, as in Plan IV. The class discussion then centered about these objects. (Modification of Plan I.) The test questions followed.

It has been readily observed that the variation of these nine plans was based on two elements: first that of material used; second, that of the extent of freedom given the child. In regard to the material, three plans (VI, VII: One Day and VII: One Week) used lantern slides in addition to the ancient Egyptian objects of the Museum, the difference being that of time-interval between the presentation of the slides and the gallery lesson in the Museum. Plans IV and IX included a story as introduction to the gallery lesson. One plan, V, included a second museum gallery for purposes of comparison with the Egyptian. This variation in kind of material used affected particularly the length of time which was spent in the Egyptian gallery.

A second distinction is in the extent of freedom given the child. In Plan I he was constantly led and directed by the teacher. Plans IV, V, VI and IX are variations of this method. In contrast to this complete adaptation of the child's interest to that of the instructor is Plan II, wherein the child's own interest leads throughout. Plans VII: One Day and VII: One Week are variations of this method. Plans III and VIII take this interest and direct it along certain definite lines, the child working in a free manner with some direction from the instructor.

RESULTS

When the papers were scored and averaged, no one plan seemed to stand out as superior to the rest. We learned upon consultation with the Research Department of the Board of Education that during the school year 1925–26, some schools had not observed the city-wide standards for the division of pupils into X, Y, and Z groups, but had adopted standards of their own. The papers were then re-checked

by the city standard, but in so doing papers from over fifty per cent of the children tested had to be discarded. This greatly decreased the number of papers available for statistical study.

General Results for the X Child

The accompanying Charts[10] No. I and II show plans to be of superior value for the X child in the following order: VII: One Week Schoolroom Preparation, III; VIII; VII: One Day Schoolroom Preparation. Plan II showed itself of least merit; Plan V of next to least merit; Plans IV, VI, IX of not sufficient superiority to be ranked of high value.

The correlation between intelligence and achievement in the Immediate Tests (Chart No. V) appears "markedly present"[11] for all superior plans noted, with the exception of VIII, which falls a bit below. Plan VI rates also within this class in correlation.

It would appear, therefore, that we have in some measure solved the problem of the X child. However, neither score nor correlation are high enough to indicate that we have reached his capacity. What possible plans might be devised in the light of these results will be discussed below.

General Results for the Y Child

Charts No. I and III show Plans III, VIII, and VII: One Day—Schoolroom Preparation markedly superior in this order for the Y child. Plan VI, with an inferiority of fifteen times, ranks the lowest of any plan. Plans II, IV, V, and IX do not indicate sufficient superiority to be classed among the more valuable methods of instruction.

Chart No. VI shows but little correlation between the mentality and accomplishment, in any plan, for the Y child. It would seem, therefore, that the child of medium or low P.L.R. within this group is scoring as high as the Y child of high or highest mentality. This would indicate that we have not succeeded in stimulating the higher Y's to a production commensurate with their ability.

[10] The technique for determining the superiority or inferiority of each plan was originated by Mr. Connor, who has kindly drawn up an explanation of the method, which will be found at the close of this study.

[11] Cf. H. Rugg, "Statistical Methods Applied to Education," pp. 256–7.

DISCUSSION OF PLANS

X and Y Groups

It may be of interest to pause and note in some detail what may be the causes for the success or failure of the individual plans. Since the results for both X and Y point so largely in the same direction, these groups will be discussed together.

In Plan II (Interest as Guide), it will be recalled that complete freedom was given the child. Charts I and II indicate that it is seemingly the plan least suited to the X mentality. It shows not a single case of superiority to any plan, and an inferiority of nine times. For the Y's also this plan shows such an inferiority that it would seem ill-suited for use. Exidently under the conditions and objectives already stated, high individualization did not lead to the best results in a class. Each child was evidently so engrossed in his special interest that he failed to notice that of his neighbor. He waited on tip-toe until he could present his own choice. This method, instead of focusing the interest of the class, dispersed it into numerous channels. Another difficulty with such an extremely individualized recitation was that so many wrong answers were given by the children. They were corrected by the teacher, but the impression left with the child must often have been one of confusion between right and wrong, especially in a case where he had gone into such detailed and concentrated observation as in this plan. That this method should score so low was a matter of great surprise to the instructor for, at the time, it seemed to bring forth the greatest enthusiasm from the children. Evidently the child's interest was highly stimulated, but was later scattered.

We should not discard this plan, however, without noting its excellencies. It is admirably adapted to a group where this very individualization is desired. For instance, a class may have been divided at school into groups, each of which is studying a specific problem. A museum visit conducted under the method of Plan II would give such group that very opportunity for specialized work which it would desire. This experiment, however, has aimed not at specialization but at providing a general background and survey. The questions given at the end of the visit tested, therefore, for a result which the very nature of the method could never be expected to produce.

The plan which showed itself of next to least merit for the X's

was Plan V (Comparison with Greece), in which a comparison was made between the arts of Greece and Rome, the teacher leading throughout. This plan evidently presented a greater variety and quantity of material than could be digested. To test this out, a comparison has been made between Plan V and another plan (IV) on certain points on which equal emphasis was made in the Greek and Egyptian material. (See Chart No. VII). The responses for the X child were less accurate in Plan V than in Plan IV. It would seem, therefore, that some confusion results after a comparison such as is made between the Egyptian and Greek. It is of importance to note also that this plan gave less time to the study of Egyptian art than did any other plan. Another reason for the failure of Plan V may be that it is but a slight modification of the Accepted Method which, in Miss Gibson's experiment, showed itself to be unsuccessful with the X's. However, we cannot say that we have adequately tested this plan, for the very nature of the experiment which tested only the Egyptian material prevented a fair testing of what the child may have gained from his contact with the Greek. In passing it is interesting to note that in Plan V, on the Immediate Test, the Y's averaged higher than the X's.

The plan which seemed to be least successful for the Y's is Plan VI, with an inferiority of fifteen times and a superiority of only two. For X's it shows itself of so little superiority that it cannot be classed among the superior plans. This plan makes use of lantern slides which are given at the museum immediately before the class enters the gallery, the teacher leading throughout. The failure of this plan may possibly be due to any or all of four factors. First, the time spent in the class room shortens the period in the galleries by a half hour. It is true that this time may be compensated for by the provision of a similar background for all, but on the other hand, the final questions tested the reaction of the child to the gallery objects rather than to the slides shown. Secondly, although many interests are introduced through the slides, there is no time to select from these and build them into a purpose. Nor is there a long enough interval between the presentation of the slides and the museum material to allow this crystallization to take place spontaneously. The child goes at once to the gallery. Thirdly, the discussion is quite out of his control, and at every point his interest is directed. Fourthly, may it not be that the slides have given a romantic touch with which the objects in

their realism are unable to compete? The very size of the objects is often greatly increased on the screen, and those in the gallery, viewed in their real dimensions, must seem of diminutive proportions.

Charts I, II, and III, indicate for both X and Y little superiority of the two plans in which the story was made use of. Plan IV, which used the fairy story, may have removed the child to such a romantic atmosphere that the objects in the room seemed gross realism in contrast. However, Plan IX showed so nearly the same result that the reason for failure must be sought in another direction. Both these plans were a variation of Plan I, in which the teacher directed or led. It may be that the child's interest was aroused by the story, but at the point where he wished to express himself, the teacher stepped in, leading the way. Further, the introduction of the story created certain obstacles to the best use of museum material. The museum material seems to us to be of primary importance, and should be offered for itself. Both story plans necessitated its use as illustrative material, rather than as original sources of knowledge and emotional stimulation to the child. In fact the story directed the attention of the child for the time rather away from the museum objects than to them. Neither of the two plans which made use of the story showed sufficient superiority to be of value for use.

Of greatest success for the X's was Plan VII: One Week—Schoolroom Preparation, in which preparation was given in the schoolroom by slides one week before the class visited the Museum. Interest must have been aroused by these slides which gained impetus as the time passed. A visit a week later came when this interest had reached a high point. Plan VII: One Day—Schoolroom Preparation, in which the visit to the museum came only one day after the schoolroom preparation by slides, was not nearly so successful with the bright children. It would seem, therefore, that the X child gains by having an increased length of time in which to play with an idea and develop it. Instead of forgetting, he grows more eager for the museum visit.

For the Y's Plan VII: One Day—Schoolroom Preparation ranks third in importance and shows itself to be much superior to VII: One Week. The Y mentality seems to be less likely to develop an interest or to hold an impression over as long a period as the X. Therefore, the museum visit should come at a much shorter interval of time after the schoolroom preparation for the Y child than for the X.

The combination of the schoolroom preparation with Plan II, the most inferior plan for the X's and one of the inferior plans for the Y's, is both fortunate and unfortunate. The results from this combination hardly indicate what the possibilities for this plan are. If the schoolroom preparation were incorporated with a superior plan it might well prove to be of even greater value than this experiment has shown it, and even more worthy of the extra time it requires. On the other hand, despite its incorporation with a poor plan, a high superiority resulted, which shows that added instruction, at certain determined intervals, undoubtedly increases greatly the certainty with which the desired objectives are attained.

Plan III (Question and Investigation) ranked second in importance for the X's and first for the Y's. (See Charts I, II, and III.) In this plan the children were presented with a list of questions upon entering the gallery, which they were asked to answer. Various elements may account for the high ranking of this plan. In the first place, the questions served to arouse interest. Even a sluggish attention might be stimulated by such a challenge. Secondly, the interest, when once aroused, was not permitted to roam in any direction, as in Plan II (Interest as Guide), but was directed and focalized. Thirdly, the questions were not so binding that the X child was hampered. On the contrary, when seeking for the answer, he was permitted the freedom and individualization which he craves.[12] Fourthly, the discussion upon the questions brought a coalescence of interest and attention not secured in any other plan. With the questions held in the hand, the child could have no doubt as to the points under discussion. Especially were these questions of value to the visual-minded child. And lastly, the questions, in addition to focalizing the attention during discussion, provided a certain amount of repetition. This evidently did not work out so happily for the X child who does not like drill, but it may account, more than any other factor, for the superior rating of this plan for the Y child.

For both X's and Y's this plan ranked superior in the Delayed Test (which was given three months after the first test) a greater number of times than any other plan. Again the instructor was surprised at the final result; for there was never apparent in the discussion the keen enthusiasm which, for instance, Plan II (Interest as Guide) had

[12] Compare above, page 3.

aroused. This method, however, seemed during the class to work more successfully with the Y's than with the X's.

The plan which ranked third in importance for the X's and second for the Y's was plan VIII. This plan is based upon the same principle as in Plan III—written questions to which the children were asked to make answer upon going into the gallery. The difference between the two plans is that in Plan VIII the response to the questions is asked for by drawing. By this method[13] we hoped to test out, if possible, how valuable drawing is in winning a heightened reaction from the child. In order to make this comparison as accurate as possible we compared two individual points in both plans (the item of "Pottery" in Question I, and the first part of Question IV). In Plan III the response was asked for by writing; in Plan VIII, by drawing. The responses to both questions do not indicate for Plan VIII any perceptible superiority or inferiority; the results for both plans are practically the same.[14] What the Delayed Test will show, after an interval of three years, will be exceedingly interesting.

Such testing on the value of drawing is, of course, not at all conclusive. In the first place, we do not know how much the child is hampered by lack of skill in drawing. Confusion in ability to express himself may lead to confusion in intellectual response. In the second place, the act of drawing may greatly enhance the child's enjoyment and appreciation of the object; but this emotional response we have not yet been able to test. That response, an emotional one, may be of greater value to him than his ability to put the intellectual conception down on paper.

GENERAL CONCLUSIONS

These results point to some conclusions which are pertinent to all of our museum instruction.

In the first place, the final scores of even the best plans for the brightest children are not high. Even where correlation between intelligence and achievement is good (Plan VII: One Week, for X, .53) the score is what we call an "average" mark, in the regular school subject. One is forced to conclude that too much material is presented at a single lesson in all of these plans. If accuracy is one of our aims,

[13] See above, p. 17.
[14] See Chart No. VIII.

it seems apparent that it would be better to attempt less and secure greater clarity.

Seemingly, the preparation by "introduction" and "difficult words" made little difference. It may have added such background as would not appear in answer to certain stipulated questions; on the other hand, it may have been presented to the child when he had no interest in the points explained and thus failed to take root.

A third minor result is the positive indication that enthusiasm does not always mean accomplishment. The very plans which created the greatest stir among the children and seemed to arouse their greatest interest and pleasure, scored lowest. A valuable pleasurable experience which we have not yet been able to measure may have been created, it is true; but as for fulfilling the objectives which we had in mind, there was only partial success in the plans which created the greatest enthusiasm.

One major result is the unusually high score for the Delayed Test in all plans. In no plan was there any markedly lower score for this test. For the X's in Plans III and V, and for the Y's in Plans IV and IX, the Delayed Test scored higher than the Immediate (See Charts V and VI). The correlation between the Immediate and Delayed Tests is good throughout; for both X and Y there are only two low correlations. This remarkable recall throughout seems to indicate clearly the value of the use of visual material. A very careful search for records of experimentation in this field has failed to reveal retentions in any school subjects which tallied as high.[15]

Another major result is the indication of the value of preparation in the school room before the museum visit. The X child benefited so apparently by this method (even in conjunction with a poor plan, such as Plan II) and the Y child scored so high, that it would seem wise to consider the advisability of adopting this preliminary preparation. (See Charts I, II, and III). The possibilities of this are discussed below under "New Plans."

In this connection, the results of the difference in intervals of

[15] Myers, Garry C., "Delayed Recall in History," Journal of Educational Psychology, May, 1917.

Norsworthy, N., "Acquisition as Related to Retention," Journal of Educational Psychology, 1912 (3:214–15).

L. J. Brueckner and H. W. Distad, "Effect of Summer Vacation in Reading Ability of First Grade Children," Elem. School Journal, May, 1924.

time between the school visit and the museum visit for different levels of mentality are of supreme importance. This exactly agrees with the laws of perseveration (the tendency of a certain quality of nerve tissue to hold impressions automatically much longer than others). The child of higher intelligence shows a higher perseveration than the Y child. That is, he holds his impressions over a longer period of time, and, as a matter of fact, does better work after a longer interval of time for thought and reflection.

Finally, these results point definitely to the same need in museum instruction that has been recognized in other fields: less instruction on the part of the teacher and more investigation on the part of the children. Where interest had been aroused and the children had been motivated to look and investigate under direction, results were good. Where the instructor's talk displaced the children's activity, the results were poor. It is as if information had been poured into a sieve. Only when the child's interest had been aroused and he took active part, did he become eager, even anxious, to learn.

NEW PLANS

Our problem now is to formulate such new methods as will do two things: first, stimulate the child to greater interest and hence to more fruitful effort; and second, secure a higher correlation between his mental ability and his accomplishment. Certain factors will act as guides. One of these factors is the common consideration of the well-known laws of learning which are apt to be disregarded outside of school circles; another is the apparent superiority of certain methods, as indicated in the present experiment; a third is the pressence of natural restrictions which exist when working with any large school system.

Let us, then, recall some of the vital laws of learning.[16] Firstly, when one is in readiness to learn he learns much more rapidly and readily. A mild interest may become a great purpose if played upon in the right way. Secondly, when this interest has been discovered or aroused, then we must mature it into a purpose, for really no change comes until the child makes an effort. We must help the child carry that purpose into activity. Thirdly, the activity must have its culmination in accomplishment.

[16] Cf. Thorndike, "Educational Psychology," Vol. I, pp. 171–3.

Coupled with the understanding of these laws must be that of the law of perseveration, with its vital bearing upon ability to retain impressions.[17] The child of medium intelligence must be given a fresh impulse when the old wears out. He can be left to work alone for a brief time, but at the end of the period he needs stimulation to help him along the way. The child of high intelligence needs this stimulation less frequently. We must not forget, too, that the psychological "make-up" of the child of higher mentality is definitely different from that of the lower. In emotion, in tension, in application, he is different, and we can not hope to apply the methods used with the Z child to the X.

Plan VII: One Week—Schoolroom Preparation (the best plan for the X's) succeeded in stimulating the child's interest to a high degree; Plan III (the best plan for the Y's and the second-best for the X's) tried to give purpose to that interest and lead it into activity. Plainly then we should combine the elements of these two plans. We can therefore see a possible plan formulating. A museum instructor, or one adequately prepared in the subject, goes to the schoolroom at a time when the class particularly needs either instruction or added impulse, or both. It would be of especial benefit if the petition for this talk might come from the children, and the instructor's visit be eagerly anticipated. After the instructor has given the talk, it would be beneficial if the children could then and there talk of the proposed museum visit and what they would like to see upon arrival. This interest, after having been aroused, might take definite shape in a series of questions, framed not by the teacher but by the children. Then the time of the museum visit (at whatever interval experimentation would have shown to be the proper one for that mentality) would be decided upon. Before actually starting forth, it might be advisable for the questions to be gone over again, others perhaps being formulated by the children to take the place of some too hastily or thoughtlessly expressed. The class, with questions in hand, would then proceed to the Museum, there to take part in a lesson modeled after Plan III, with the very important difference that the questions would be those which the children themselves, as a class, had formulated in a high burst of enthusiasm and interest. This then, may be the model plan.

[17] See above, page 28.

Certain physical reasons make this plan, however, at the present time, unable to be realized. Funds, principally, are lacking for the provision of these special teachers, even though their number need not be large. Again, the consideration of schedule and organization is an important one. With the present system of scheduling classes it would be no easy matter to adjust the visit of the class at the proper interval following the schoolroom visit of the museum instructor.

If, at the present moment, it is not possible to adopt this superior method, then let us turn to a formulation of a plan approaching it as nearly as possible. Plainly, if a special teacher cannot go to the schoolroom then the next best plan would be to provide the schoolroom teacher with such excellently prepared material that she herself could present the talk with a minimum of effort and preparation. By photographs or slides, or both, she could give the preliminary talk, stimulating the children to draw up their points of inquiry in question form, as in the proposed new plan. The remainder of the procedure would be the same as that of the new plan. This plan, it is hoped, will be accepted and put into operation by many teachers in coöperation with the museum staff.

Where it cannot be, then we must fall back upon the third choice, Plan III, which scored highest for the Y's and second highest for the X's. The dissatisfaction with this plan is that the stimulation of interest is predetermined by the questions which the teacher holds in her hand. This need not, however, be as artificial as would appear at first glance. Let us, in each field of study, try to earn by experimentation what the child's native and spontaneous interest is. In the present experiment that very effort was made, and the discussions and various sets of questions were based upon those results. By this effort to learn the child's interest, we may in time feel somewhat certain of satisfying the native interest of the majority, if not of each specific mind.

With this objection disposed of, we can consider the final form of Plan III. Its success (as that of every other plan made use of in any and every museum visit) would be enhanced many times if the children were stimulated by the schoolroom teacher to keen anticipation of the proposed visit. All too frequently the children come with hardly a realization of the purpose of their visit. Consider then the children's appearing equipped with a heightened interest and anticipation. The instructor would talk with them for a few minutes, moti-

vating her talk in the direction of the questions which she holds in her hand. These, passed to the children, would direct their investigation and form the foundation upon which the class discussion would be built, exactly as in the original statement of Plan III (see page 15).

SUGGESTED FURTHER EXPERIMENTS

In addition to further experimentation on method as noted above, the present problem points to some other investigation.

As was suggested earlier, we hope to test the children after a three-year period by the test already given. Although this may prove impracticable, there is a possibility that a sufficient number of children who took the original test can be found. The question of recall after such a long period has been hardly investigated, and, as far as we have been able to learn, no results on such recall are recorded.

Other lesson plans might be tried; one only is suggested. It might be of benefit to follow the museum lesson by a visit to the school, presenting slides which relate to the objects seen and to general background as well. The regular test would have been given at the museum and then followed by the Delayed Test in three months, as in the present experiment. This might prove more efficacious than to precede the museum trip by the talk at school.

The fact that the scores on the delayed tests indicated an unusual amount of recall seems to confirm the already current opinion of the value of visual instruction at the Museum. It might, however, be worth while to test still further the value of a museum visit. The instructor might go to the school and merely talk about the objects in the museum, and then test the children. These results would be compared with those of a group which had had, instead of the schoolroom talk, a museum visit. There is an additional experiment suggested here in the use of slides as visual material. The talk might be given at the school with the slides, or again without. We would then be testing three types: the lesson of the spoken word, the lesson of slides, and the lesson of the museum visit.

Finally, some experimentation is needed to determine just how much material should be presented at the time of a museum visit. The final score, as already stated, seems to indicate that too much material was presented and that it could not all be assimilated. It might be wise to vary the amount of material, testing on various quantities. It

may be (we do not know, since no statistics for comparison are available) that the scores made by these children are as high as those in the average school subjects. It might be of benefit, therefore, for the schoolroom teacher to present some new material and then given both Immediate and Retention Tests, these scores to be compared with those secured on new material at the museum.

It is apparent, therefore, that in this experiment we have merely pointed out the need of further experimentation. In addition to the possibilities of experimentation just noted, it would be exceedingly valuable if some other museum or museums were to try out, along the same lines, the experiment attempted at the Cleveland Museum. The instructor made every attempt to present each plan impartially and with equal emphasis of enthusiasm. Results would indicate that her own preference in plan did not make for higher score; for the very plans which she especially favoured and took keenest pleasure in presenting (such as II and VI) won the lowest score, while such plans as III and VIII, which seemed to win little enthusiasm from the children and thus were less popular with the instructor, scored extremely high. Even so, it would be valuable to determine if other personal or physical factors exerted such influence as would change the emphasis of superiority or inferiority of method. The Cleveland Museum would take pleasure in answering questions in regard to the technique observed in carrying on the experiment or on any detail in connection with it.

STATISTICAL TREATMENT OF DATA OF THE STUDY

The data in this study were collected during the school years 1924–26. The author assumed that the classification of pupils in Cleveland elementary schools into X, Y, and Z groups was sufficiently standardized to make the classes in each group approximately equal in ability. Her first step, then, was to see how the different plans of instruction compared with each other in terms of the achievement of classes in the same group taught by the different plans. The results of these comparisons were totally unintelligible. When the study had progressed to this baffling stage the author brought her material to the Bureau of Educational Research for help, and the following plan for treating the data was evolved:

1. Museum test scores for all pupils for whom mental test records—"P. L. R.'s"[1]—were not available were discarded.

2. Each two groups compared on the museum test were also compared as to the average of "P.L.R.'s"

3. Preliminary comparisons, both on basis of museum test results and "P. L. R.'s," were made in terms of the "Probable Error of the Difference of the Averages." In other words, the $P.E._{Dif.\ of\ Av.}$ was made the unit of measure in determining all differences.

4. The $P.E._{Dif.\ of\ Av.}$ obtained by treating the museum test data was assumed, in each case, to be commensurable with the $P.E._{Dif.\ of\ Av.}$ obtained by treating the "P. L. R.'s."

5. Differences in achievement were then obtained in terms of these two differences according to the following formula:

If a = result of any plan and b = result of any other plan, then

$$a - b = \left(\frac{Av._a - Av._b}{P.E._{Dif.\ of\ Av.}}\right)_{Museum\ Test} - \left(\frac{Av._a - Av._b}{P.E._{Dif.\ of\ Av.}}\right)_{P.L.R.'s}$$

6. Results were judged as follows:

+3 P. E., or more, Plan a is *superior* to Plan b.
+2.99 to −2.99, neither plan is superior to the other.
−3 P. E., or less, Plan a is *inferior* to Plan b.

7. Results were shown graphically as follows:

		Inferior	*Superior*
Plan II − Plan III X Group	P.L.R.	6.35 P.E.	
	Immediate	3.84 P.E.	
	Delayed	.52 P.E.	

[1] Probable Learning Rate—a group test I. Q.

In "Immediate Test," neither plan is *superior*. In "Delayed Test," Plan II is *superior*.

Plan III — Plan VII W
Y Group

2.33	P.L.R.	
Im.		1.04
De.	2.12	

In both "Immediate" and "Delayed Tests" Plan III is *superior*.

Plan IV — Plan VII D
Y Group

Inferior		*Superior*
.5	P.L.R.	
4.71	Immediate	
Delayed		.91

In "Immediate Test" Plan IV is *inferior*. In "Delayed Test" neither plan is *superior*.

CHART IV

STATEMENT SHOWING NUMBER OF TIMES EACH PLAN IS EITHER SUPERIOR OR INFERIOR TO EVERY OTHER PLAN

	X			Y			
	Immediate	Delayed	Total	Immediate	Delayed	Total	Grand total
Plan II: Interest as Guide:							
Superior	0	0	0	2	1	3	3
Inferior	3	6	9	0	0	0	9
Plan III: Question and Investigation:							
Superior	1	4	5	3	4	7	12
Inferior	0	0	0	0	0	0	0
Plan IV: Fairy Story Method:							
Superior	0	1	1	1	1	2	3
Inferior	1	1	2	1	0	1	3
Plan V: Comparison with Greece:							
Superior	0	0	0	2	1	3	3
Inferior	5	2	7	0	1	1	8
Plan VI: Lantern Introduction:							
Superior	1	1	2	0	0	0	2
Inferior	0	0	0	7	8	15	15
Plan VII: One Day—Schoolroom Preparation:							
Superior	2	1	3	4	1	5	8
Inferior	0	0	0	0	1	1	1
Plan VII: One Week—Schoolroom Preparation:							
Superior	4	3	7	0	1	1	8
Inferior	0	0	0	4	2	6	6
Plan VIII: Drawing Method:							
Superior	3	1	4	3	2	5	9
Inferior	0	0	0	0	0	0	0
Plan IX: Instructive Story Method:							
Superior	0	0	0	1	1	2	2
Inferior	2	2	4	4	0	4	8

CHART V

PLAN	NUMBER OF CHILDREN	NUMBER OF SCHOOLS	X				CORRELATION		
			Average on PLR or IQ	Median of PLR or IQ	Average on Immediate Test	Average on Delayed Test	Between PLR and Immediate	Between PLR and Delayed	Between Immediate and Delayed
II. Interest as Guide.....	34	3	125.9	125	82.5	78.8	.282	.325	.35
III. Question and Investigation.....	34	5	116.3	115	74.9	77.8	.397	.106	.42
IV. Fairy Story Method....	45	4	118.5	118.1	75.2	75.8	.19	.32	.60
V. Comparison with Greece.	47	6	116.3	116.5	70.9	74.04	−.05	.22	.41
VI. Lantern Introduction..	42	4	117.9	116.5	81	77.4	.37	.15	.46
VII. 1 day: Schoolroom Preparation.....	29	2	118.1	115.3	80	76.6	.47	.04	.50
VII. 1 Week: Schoolroom Preparation.....	35	3	119.6	118.8	84.6	81.7	.53	.43	.57
VIII. Drawing Method.....	43	4	118.4	118.2	80.2	78.7	.32	.34	.39
IX. Instructive Story Method.....	38	4	118.9	118	75.8	74.3	.32	.001	.39
	347								

Note: The test given at the Museum, following the Museum Lesson, is called the Immediate Test.

The Test given at the School, after an interval of from 2½ to 3 months from the time of the Museum visit, is called the Delayed Test.

CHART VI

PLAN	NUMBER OF CHILDREN	NUMBER OF SCHOOLS	Y				CORRELATIONS		
			Average on PLR or IQ	Median of PLR or IQ	Average on Immediate Test	Average on Delayed Test	Between PLR and Immediate	Between PLR and Delayed	Between Immediate and Delayed
II. Interest as Guide.....	26	3	100	100.8	71	69.4	.133	−.172	.44
III. Question and Investigation.....	67	5	100.7	102.8	73.8	73.6	.151	.04	.58
IV. Fairy Story Method...	44	4	101	101.5	70.6	71.4	.03	.09	.41
V. Comparison with Greece.....	51	6	99.7	100.2	71.7	67.3	.29	.023	.52
VI. Lantern Introduction..	46	4	103.3	104	67.7	65	.095	−.002	.52
VII. 1 Day: Schoolroom Preparation.....	26	2	101.5	102.7	79.6	69.6	.12	.65	.24
VII. 1 Week: Schoolroom Preparation.....	29	3	102.6	105.2	72.1	69.7	.17	.096	.54
VIII. Drawing Method.....	38	4	100.6	102.8	74.6	72.9	−.16	−.24	.22
IX. Instructive Method....	47	4	101	102.3	67.1	69.5	.14	.22	.61
	314								

Note: The test given at the Museum, following the Museum Lesson, is called the Immediate Test.

The Test given at the school, after an interval of from 2½ to 3 months from time of Museum visit, is called the Delayed Test.

CHART VII

COMPARISON BETWEEN PLAN IV AND V

	X								Y							
	Question III—Part 2				Question IV—Part 1				Question III—Part 2				Question IV—Part 1			
	IV		V		IV		V		IV		V		IV		V	
	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed
Number in Class	36	36	36	36	36	36	36	36	39	39	39	39	39	39	39	39
Number of total correct responses	29	29	22	19	31	31	31	28	25	21	27	24	28	32	35	31
Per cent of total correct responses	80.5	80.5	61	52.7	86.1	86.1	86.1	77.7	64	53.8	69.2	61.5	71.7	82	89.7	79.4
Number who answered correctly on both Immediate and Delayed	27		14		28		25		16		16		26		27	
Per cent who answered correctly on both Immediate and Delayed	75		38.8		77.7		69.4		41		41		66.6		69.2	
Number who failed to answer correctly on Delayed who had answered correctly on Immediate	2		5		2		5		8		10		2		6	
Per cent who failed to answer correctly on Delayed who had answered correctly on Immediate	.068		22.7		.064		16.1		32		37		.071		17.1	

CHART VIII

Comparison between Plans III and VIII

	X								Y							
	I (b)—Pottery				IV (1)—Position of Figure				I (b)—Pottery				IV (1)—Position of Figure			
	III		VIII		III		VIII		III		VIII		III		VIII	
	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed
Number in Class	25	25	25	25	25	25	25	25	34	34	34	34	34	34	34	34
Number of total correct answers	21	23	22	23	21	19	23	20	31	34	34	32	28	27	18	18
Per cent of total correct answers	84	92	88	92	84	76	92	80	91.1	100	100	94.1	82.3	79.4	52.9	52.9
Number who answered correctly on both Immediate and Delayed	20		22		18		18		31		32		24		12	
Per cent who answered correctly on both Immediate and Delayed	80		88		72		72		91.1		94.1		70.5		35.2	
Number who failed to answer correctly on Delayed who had on Immediate	1		0		3		5		0		2		4		6	
Per cent who failed to answer correctly on Delayed who had on Immediate	.047				.142		21.7		0		58.8		14.2		33.3	